

To: Development Services Pascua Yaqui

Date: June 16, 2016

Address: 7474 S. Camino de Oeste

Sender: Dave Nicholson

Tucson, Arizona 85746

MEC File No.: 16-014

Attention: Plan Reviewer

1 pages total

Tel No:

Originals will **NOT** follow by mail

Fax No:

Reference: Pascua Yaqui Clinic Addition 2012 IECC Mechanical Compliance

Attached is the COMCheck 2012 IECC Mechanical Compliance Certificate Report for the Pascua Yaqui Clinic Addition Project. The Report has been completed in accordance with the following 2012 IECC requirements and exceptions.

1. Section C406 Additional Efficiency Package Options with Option No. 1 (Efficient HVAC Performance in accordance with Section C406.2) selected.
2. Section C403.3.1 Economizers Exception No. 6 (Where the cooling efficiency meets or exceeds the efficiency requirements in Table C403.3.1(2)).

The COMCheck software program does not have provisions for applying Economizer Exception No. 6 in Section C4043.3.1 of the 2012 IECC. The COMCheck program requires selection of an economizer option in order to complete the Report. The Air Economizer option has been selected for the purpose of completion of the attached Report for the following systems; HP-1. However, air economizers are not provided for the systems listed above in accordance with Economizer Exception No. 6 in Section C403.3.1 of the 2012 IECC.

Please review the attached Report accordingly.

Please contact me with any questions.

MECHANICAL ENGINEERING CONSULTANTS, LLC



By: David D. Nicholson



Mechanical Compliance Certificate

2012 IECC

Section 1: Project Information

Project Type: **New Construction**

Project Title : Pascua Yaqui Clinic Addition

Construction Site:

Owner/Agent:

Designer/Contractor:

Tucson, AZ

Additional Efficiency Package: **High efficiency HVAC. Systems not satisfying the performance requirement are identified in the specific system requirement section below. Full compliance with this efficiency option requires inspection and verification that each system meets the required performance criteria.**

Section 2: General Information

Building Location (for weather data):

Tucson, Arizona

Climate Zone:

2b

Section 3: Mechanical Systems List

Quantity System Type & Description

- 1 HVAC System 1 (Single Zone) : Single Package Heat Pump
 Heating Mode: Capacity = 48 kBtu/h,
 Proposed Efficiency = 9.00 HSPF, Required Efficiency = 8.50 HSPF
 Cooling Mode: Capacity = 48 kBtu/h, , Air Economizer
 Proposed Efficiency = 16.00 SEER, Required Efficiency = 15.00 SEER
 Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes

Fans:

FAN 1 Supply, Constant Volume, 1600 CFM, 1.0 motor nameplate hp

Section 5: Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2012 IECC requirements in COMcheck Version 3.9.3 and to comply with the mandatory requirements in the Requirements Checklist.

David Nicholson - Principal

06.16.16

Name - Title

Signature

Date

Section 6: Post Construction Compliance Statement

- HVAC record drawings of the actual installation and performance data for each equipment provided to the owner within 90 days after system acceptance.
- HVAC O&M documents for all mechanical equipment and system provided to the owner within 90 days after system acceptance.
- Written HVAC balancing report provided to the owner.

The above post construction requirements have been completed.

Principal Mechanical Designer-Name

Signature

Date



COMcheck Software Version 3.9.3

Inspection Checklist

Energy Code: 2012 IECC

Requirements: 80.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

| | | | | | |
|---|----------------------|---|------------------------|---|---------------------|
| 1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3) |
|---|----------------------|---|------------------------|---|---------------------|

| 2012 IECC | Plan Review | Complies? | Comments/Assumptions |
|------------------------------|--|--|--------------------------|
| C103.2 [PR2] ¹ | Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C406 [PR9] ¹ | Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |

Additional Comments/Assumptions:

| | | |
|------------------------|--------------------------|-----------------------|
| 1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3) |
|------------------------|--------------------------|-----------------------|

| 2012 IECC | Footing / Foundation Inspection | Complies? | Comments/Assumptions |
|----------------------------------|--|--|---|
| C403.2.4.5 [FO9] ³ | Freeze protection and snow/ice melting system sensors for future connection to controls. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. |

Additional Comments/Assumptions:

| | | |
|------------------------|--------------------------|-----------------------|
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|------------------------|--------------------------|-----------------------|

| Section # & Req.ID | Mechanical Rough-In Inspection | Plans Verified Value | Field Verified Value | Complies? | Comments/Assumptions |
|--|--|---|---|--|--|
| C403.2.3 [ME55] ² | HVAC equipment efficiency verified. | Efficiency: _____ | Efficiency: _____ | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | See the Mechanical Systems list for values. |
| C403.2.5.1 [ME59] ¹ | Demand control ventilation provided for spaces >500 ft ² and >25 people/1000 ft ² occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. |
| C403.2.7 [ME60] ² | HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection. | R- _____ | R- _____ | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.8 [ME41] ³ | Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. |
| C403.2.7 [ME10] ² | Ducts and plenums sealed based on static pressure and location. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.7.1.3 [ME11] ³ | Ductwork operating >3 in. water column requires air leakage testing. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. See the Mechanical Systems list for values for HVAC System 1. |
| C403.3.1, C403.3.1.1 [ME62] ¹ | Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply - High Efficiency Equipment, See Memo See the Mechanical Systems list for values for HVAC System 1. |
| C408.2.2.1 [ME53] ³ | Air outlets and zone terminal devices have means for air balancing. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.4.2 [ME66] ² | VAV fan motors >=7.5 hp to be driven by variable speed drive, have a vane-axial fan with variable pitch blades, or have controls to limit fan motor demand. | <input type="checkbox"/> VSD <input type="checkbox"/> Vane axial fan <input type="checkbox"/> Other | <input type="checkbox"/> VSD <input type="checkbox"/> Vane axial fan <input type="checkbox"/> Other | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. See the Mechanical Systems list for values for HVAC System 1. |
| C403.2.6 [ME57] ¹ | Exhaust air energy recovery on systems meeting Table C403.2.6 | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | |
| C403.2.11 [ME71] ² | Unenclosed spaces that are heated use only radiant heat. | | | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Exception: Requirement does not apply. |

Additional Comments/Assumptions:

| | | |
|------------------------|--------------------------|-----------------------|
| 1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3) |
|------------------------|--------------------------|-----------------------|

| | | | | | |
|---|----------------------|---|------------------------|---|---------------------|
| 1 | High Impact (Tier 1) | 2 | Medium Impact (Tier 2) | 3 | Low Impact (Tier 3) |
|---|----------------------|---|------------------------|---|---------------------|

| 2012 IECC | Final Inspection | Complies? | Comments/Assumptions |
|--|---|--|--|
| C403.2.4.2 [FI47] ³ | Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. <i>See the Mechanical Systems list for values for HVAC System 1.</i> |
| C403.2.4.2 [FI38] ³ | Thermostatic controls have a 5 °F deadband. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.4.2 [FI20] ³ | Temperature controls have setpoint overlap restrictions. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.4.3 [FI39] ³ | Each zone equipped with setback controls using automatic time clock or programmable control system. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.4.3 [FI40] ³ | Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.4.3.3 [FI41] ³ | Systems include optimum start controls. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. <i>See the Mechanical Systems list for values for HVAC System 1.</i> |
| C408.2.5.1 [FI7] ³ | Furnished HVAC as-built drawings submitted within 90 days of system acceptance. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C303.3, C408.2.5.2 [FI8] ³ | Furnished O&M manuals for HVAC systems within 90 days of system acceptance. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C408.2.5.3 [FI43] ¹ | An air and/or hydronic system balancing report is provided for HVAC systems. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply - High Efficiency Equipment, See Memo |
| C408.2.3.2 [FI10] ¹ | HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C403.2.2 [FI27] ³ | HVAC systems and equipment capacity does not exceed calculated loads. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C408.2.1 [FI28] ¹ | Commissioning plan developed by registered design professional or approved agency. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply |
| C408.2.4 [FI29] ¹ | Preliminary commissioning report completed and certified by registered design professional or approved agency. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply |

1 High Impact (Tier 1)
 2 Medium Impact (Tier 2)
 3 Low Impact (Tier 3)

| 2012 IECC | Final Inspection | Complies? | Comments/Assumptions |
|-----------------------------------|--|--|---|
| C408.2.5.4 [FI30] ¹ | Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply |
| C408.2.3.1 [FI31] ¹ | HVAC equipment has been tested to ensure proper operation. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |
| C408.2.3.3 [FI32] ¹ | Economizers have been tested to ensure proper operation. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Location on plans/spec: Does Not Apply - High Efficiency Equipment, See Memo |
| C406 [FI34] ¹ | Efficient HVAC performance, efficient lighting system, or on-site supply of renewable energy consistent with what is shown the approved plans. | <input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable | Requirement will be met. |

Additional Comments/Assumptions:

| | | | | | |
|---|----------------------|---|------------------------|---|---------------------|
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|---|----------------------|---|------------------------|---|---------------------|

System Checksums

By Microsoft

HP-1 Offices

Incremental Heat Pump

| COOLING COIL PEAK | | | | | CLG SPACE PEAK | | | HEATING COIL PEAK | | | TEMPERATURES | | |
|--|--------------------|-----------------|---------------|-----------|----------------------|----------------|----------------------|-----------------------|--------------------|----------------------|--------------|-----|-----|
| Peaked at Time: Mo/Hr: 7 / 15 | | | | | Mo/Hr: 6 / 15 | | | Mo/Hr: 13 / 1 | | | | | |
| Outside Air: OADB/WB/HR: 107 / 66 / 40 | | | | | OADB: 108 | | | OADB: 24 | | | | | |
| | Space Sens. + Lat. | Plenum Sensible | Plenum Latent | Net Total | Percent Of Total (%) | Space Sensible | Percent Of Total (%) | Space Peak Space Sens | Coil Peak Tot Sens | Percent Of Total (%) | SADB | Clg | Htg |
| | Btu/h | Btu/h | Btu/h | Btu/h | | Btu/h | | Btu/h | Btu/h | | | | |
| Envelope Loads | | | | | | | | | | | | | |
| Skylite Solr | 0 | 0 | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| Skylite Cond | 0 | 0 | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| Roof Cond | 0 | 3,494 | | 3,494 | 12.68 | 0 | 0.00 | 0 | -1,764 | 12.32 | | | |
| Glass Solar | 732 | 0 | | 732 | 2.66 | 723 | 3.34 | 0 | 0 | 0.00 | | | |
| Glass Cond | 1,365 | 0 | | 1,365 | 4.95 | 1,408 | 6.51 | -1,872 | -1,872 | 13.07 | | | |
| Wall Cond | 3,408 | 716 | | 4,124 | 14.97 | 3,361 | 15.54 | -2,859 | -3,728 | 26.02 | | | |
| Partition | 0 | | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| Exposed Floor | 0 | | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| Infiltration | 0 | | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| <i>Sub Total ==></i> | 5,505 | 4,210 | | 9,716 | 35.26 | 5,492 | 25.39 | -4,731 | -7,364 | 51.41 | | | |
| Internal Loads | | | | | | | | | | | | | |
| Lights | 3,567 | 3,567 | | 7,133 | 25.89 | 3,567 | 16.49 | 0 | 0 | 0.00 | | | |
| People | 5,400 | | | 5,400 | 19.60 | 3,000 | 13.87 | 0 | 0 | 0.00 | | | |
| Misc | 1,783 | 0 | 0 | 1,783 | 6.47 | 1,783 | 8.24 | 0 | 0 | 0.00 | | | |
| <i>Sub Total ==></i> | 10,750 | 3,567 | 0 | 14,316 | 51.96 | 8,350 | 38.60 | 0 | 0 | 0.00 | | | |
| Ceiling Load | 7,777 | -7,777 | | 0 | 0.00 | 7,791 | 36.01 | -2,633 | 0 | 0.00 | | | |
| Outside Air | 0 | 0 | 0 | 3,219 | 11.69 | 0 | 0.00 | 0 | -6,960 | 48.59 | | | |
| Sup. Fan Heat | | | | 299 | 1.09 | | 0.00 | | 0 | 0.00 | | | |
| Ret. Fan Heat | | 0 | | 0 | 0.00 | | 0.00 | | 0 | 0.00 | | | |
| Duct Heat Pkup | | 0 | | 0 | 0.00 | | 0.00 | | 0 | 0.00 | | | |
| OV/UNDR Sizing | 0 | | | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | | | |
| Exhaust Heat | | 0 | 0 | 0 | 0.00 | | 0.00 | | 0 | 0.00 | | | |
| Terminal Bypass | | 0 | 0 | 0 | 0.00 | | 0.00 | | 0 | 0.00 | | | |
| Grand Total ==> | 24,032 | 0 | 0 | 27,550 | 100.00 | 21,633 | 100.00 | -7,364 | -14,323 | 100.00 | | | |

| AIRFLOWS | | |
|----------------|---------|---------|
| | Cooling | Heating |
| Vent | 150 | 150 |
| Infil | 0 | 0 |
| Supply | 1,262 | 1,262 |
| Mincfm | 0 | 0 |
| Return | 1,262 | 1,262 |
| Exhaust | 150 | 150 |
| Rm Exh | 0 | 0 |
| Auxil | 0 | 0 |

| ENGINEERING CKS | | |
|-------------------|---------|---------|
| | Cooling | Heating |
| % OA | 11.9 | 11.9 |
| cfm/ft² | 1.21 | 1.21 |
| cfm/ton | 549.52 | |
| ft²/ton | 455.17 | |
| Btu/hr-ft² | 26.36 | -13.71 |
| No. People | 12 | |

| COOLING COIL SELECTION | | | | | | | | | | AREAS | | | HEATING COIL SELECTION | | | | | | |
|------------------------|----------------|------|-----------|------------|----------------|------|------|----------------|-------|-------|-------------|-------|------------------------|--------------|------------|-------|------|------|-----|
| | Total Capacity | | Sens Cap. | Coil Airfl | Enter DB/WB/HR | | | Leave DB/WB/HR | | | Gross Total | Glass | | Capacity | Coil Airfl | Ent | Lvq | | |
| | ton | MBh | | | MBh | cfm | °F | °F | gr/lb | °F | | °F | gr/lb | | | | | ft² | (%) |
| Main Clg | 2.3 | 27.6 | 27.2 | 1,262 | 76.2 | 59.9 | 59.0 | 54.8 | 51.8 | 58.5 | Floor | 1,045 | | Main Htg | -14.3 | 1,262 | 64.5 | 75.8 | |
| Aux Clg | 0.0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Part | 0 | | Aux Htg | 0.0 | 0 | 0.0 | 0.0 | |
| Opt Vent | 0.0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ExFlr | 0 | | Preheat | 0.0 | 0 | 0.0 | 0.0 | |
| | | | | | | | | | | | Roof | 1,045 | 0 | 0 | Reheat | 0.0 | 0 | 0.0 | 0.0 |
| | | | | | | | | | | | Wall | 1,122 | 78 | 7 | Humidif | 0.0 | 0 | 0.0 | 0.0 |
| Total | 2.3 | 27.6 | | | | | | | | | | | | Opt Vent | 0.0 | 0 | 0.0 | 0.0 | |
| | | | | | | | | | | | | | | Total | -14.3 | | | | |